

A NEW SPECIES OF THE COLUBRID SNAKE
GENUS *LIOPHIS* FROM BRAZIL

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Abstract.—A new species of the colubrid snake genus *Liophis* (*L. maryellenae*) is described from the Brazilian state of Minas Gerais. Its closest congener is *L. jaegeri*, differing only in the number of body scale rows. The new species shows some affinities to *L. viridis* by its color and body scale rows.

A total of approximately 5600 specimens of 31 species of the colubrid snake genus *Liophis* were examined during the past eight years. Nearly all species were represented by 15 or more specimens. However, one taxon, represented by only ten individuals, was unique in having a combination of relatively small size at sexual maturity (474 mm total length), a scale row reduction of 19-19-17, no apical scale pits, and relatively high numbers of long, slender maxillary teeth (25-28). This taxon is similar to *Liophis jaegeri* in size, somewhat in color and color pattern, number of ventrals, subcaudals, head scales, maxillary teeth; tail length/total length ratio, and length of in situ hemipenes. However, it differs in the number of scales around the body. The species is also similar to *Liophis viridis* in color, number of scales around the body, but differs by fewer number of ventrals, higher tail length/total length ratio, and number of maxillary teeth. Other *Liophis* species that occur sympatricly or parapatricly with the new form are *L. miliaris*, *L. poecilogyrus*, *L. jaegeri*, *L. almadensis*, and *L. dilepis*.

Liophis maryellenae, new species

Fig. 1

Holotype.—American Museum of Natural History (AMNH) 62202, adult male, taken (with AMNH 62206) from Annapolis (16°20'S-48°58'W), Goias, Brazil, 7 Mar 1936, by R. M. Gilmore (found unlabelled with Gilmore collection when material was cataloged).

Paratypes (All from Brazil).—AMNH 62206 female, Annapolis, Goias; Texas Cooperative Wildlife Collection (TCWC) 57701, female, 13°10'S, 46°00'W, ca. 150 km SW Barreiras, Bahia; Natural History Museum, Paris (MNHP) 3565, female, "Brazil"; Museum of Zoology, University of São Paulo (MZUSP) 6609 male, D. F., Brazilia (16°12'S, 44°26'W); MZUSP 8059 male, Minas Gerais, Itambe do Mato Dentro (19°24'S, 43°19'W); MZUSP 7989 female, Minas Gerais, Grao Mogol (16°34'S, 42°54'W); Instituto Butantan (IB) 1209 male, IB 5680 female, Minas Gerais, Araguari (18°39'S, 48°12'W); IB 12559 male, Minas Gerais, Ouro Branco.

Description of holotype.—Measurements in mm; total length 325; tail length 81; tail/total length ratio 0.249; head length 11.5; head width 6.8; eye diameter 2.4; eye/nostril distance 2.2; eye/snout distance 3.4; frontal width 2.1; frontal length 4.0; head width/head length ratio 0.59; eye diameter/eye-nostril distance 0.936; frontal width/frontal length ratio 0.525.

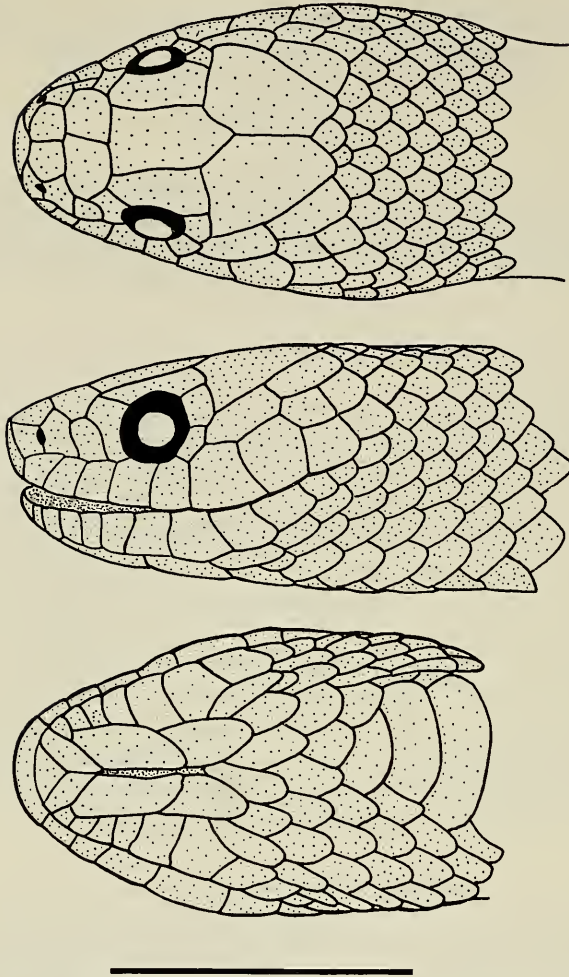


Fig. 1. Dorsal, lateral and ventral views of the head of *Liophis maryellenae* (TCWC 57710). Black bar equals one cm.

Scale rows number 19-19-17, smooth, no apical scale pits, reduction to 17 scale rows occurs through fusion of scale rows 3 + 4 over 79th ventral; tail scale row reduction 8-6-4-2 over 9th, 18th, and 41st subcaudals, respectively. Ventrals number 150, subcaudals 69; supralabials are 8-8, with 4th and 5th entering orbit; infralabials 10-10; preoculars 1-1, postoculars 2-2, temporals 1 + 2, loreal 1-1, 27 maxillary teeth, last two enlarged, ungrooved and separated from remainder by diastema equal to width of ectopterygoid process of maxillary; anal shield divided. Color (in alcohol): overall grayish brown; head uniform grayish brown; anterolateral portion of nasal scale and dorsal tip of rostral, whitish; supralabials 1-4 tipped with grayish brown, supralabials 7-8 dark grayish brown, remainder of supralabials, infralabials, chin, throat, and anterior 10-12 ventrals whitish. Hemipenes spinose, without calyces, but with apical, smooth disc; in situ hemipenis 12 subcaudals in length, slightly bilobed, lobe about two subcaudals in

length; sulcus spermaticus forks at sixth subcaudal; basal naked pocket present; shank of hemipenis with moderate sized spines that slowly decrease in size towards tip of apical disc.

Variation.—The five female paratypes differ from the holotype as follows: number of ventrals vary from 146–153, \bar{x} = 149.6; number of subcaudals vary from 62–73, \bar{x} = 66.2; infralabials 10(4), 11(1); supralabials, preoculars, postoculars, temporals, supralabials entering orbit, loreal, and anal plate invariable, 8, 1, 2, 1 + 2, 4 + 5, 1, divided, respectively; tail/total length ratios vary from 0.221–0.254, \bar{x} = 0.237; total length varies from 295–530, \bar{x} = 420.8 mm; reduction site varies from 82nd to 85th, \bar{x} = 84.2 ventral; diameter of eye/snout distance ratio varies from 0.605–0.697, \bar{x} = 0.666; tail scale row reduction of 8-6-4-2 occurs over subcaudals 9, 23, 48, or 8, 23, 50, respectively (not recorded for MNHP specimen).

The AMNH female paratype has a paravertebral dark stripe beginning at the 96 ventral on the seventh scale row, passing posteriorly onto the upper edge of the fourth scale row of the tail. Gilmore's field notes for the latter specimen are "neck greenish, below and behind yellowish brown." Color in life of the Bahia (TCWC) specimen "dark gray-green dorsum, yellow-orange venter." Neither color descriptions mention the presence of lateral and/or paravertebral dark lines of the body, but they are present in preservative (Fig. 2a, b).

Besides the faint "lined" patterns that appear in preservation, definite areas of darkened pigment appear as well as defined patterns in other specimens (Fig. 2c, d). The patterns may appear as paravertebral lines on the eighth scale row and a series of dashes or dots on scale row four and frequently parts of scale rows three and five. Occasionally, a series of black flecks (spots?) occur in scale rows one, two, three, four, seven and/or eight, or any combination of these. The venter is immaculate cream or yellowish in preservation, with some darkening along the outer edge of scale row one and the adjoining ventral. The dark color may extend completely across the ventral along its anterior edge.

Five males vary as follows: number of ventrals vary from 144–159, \bar{x} = 152.2; number of subcaudals vary from 64–82, \bar{x} = 69.6; supralabials, infralabials, preoculars, postoculars, temporals, supralabials entering orbit, loreal, and anal plate invariable, 8, 10, 1, 2, 1 + 2, 4 + 5, 1, divided, respectively. The tail/total length ratio varies from 0.234–0.262, \bar{x} = 0.243; total length varies from 325–435, \bar{x} = 394.4 mm; hemipenial length in situ varies from 9.5 to 12, \bar{x} = 10.5 subcaudals; reduction site varies from the 78th to 95th, \bar{x} = 83.4 ventral; diameter of eye/snout distance ratio varies from 0.632–0.844, \bar{x} = 0.706; tail scale row reduction of 10-8-6-4-2 for two males and 8-6-4-2 for one male occur over subcaudals 7, 17, 38, 63; 5, 7, 26, 58; 10, 20, 43, respectively. Maxillary teeth for both sexes vary from 25–28; \bar{x} = 26.1.

Distribution.—This taxon is known only from the tablelands of southeast Brazil (Fig. 3).

Comments.—Two "green" *Liophis* species (*jaegeri*, *viridis*) are sympatric and/or parapatric with *L. maryellenae*. *Liophis viridis* appears to be sympatric with it (at least the ranges appear to overlap) in eastern Brazil (Fig. 3), and *Liophis jaegeri*, its closest congener, overlaps the southeastern distribution of *L. maryellenae* (Fig. 3).

Liophis maryellenae and *L. jaegeri* may hybridize where the range of the two species coalesce in the vicinity of Belo Horizonte, Minas Gerais. There are seven specimens (Instituto Butantan) from the latter vicinity that show aberrancies in

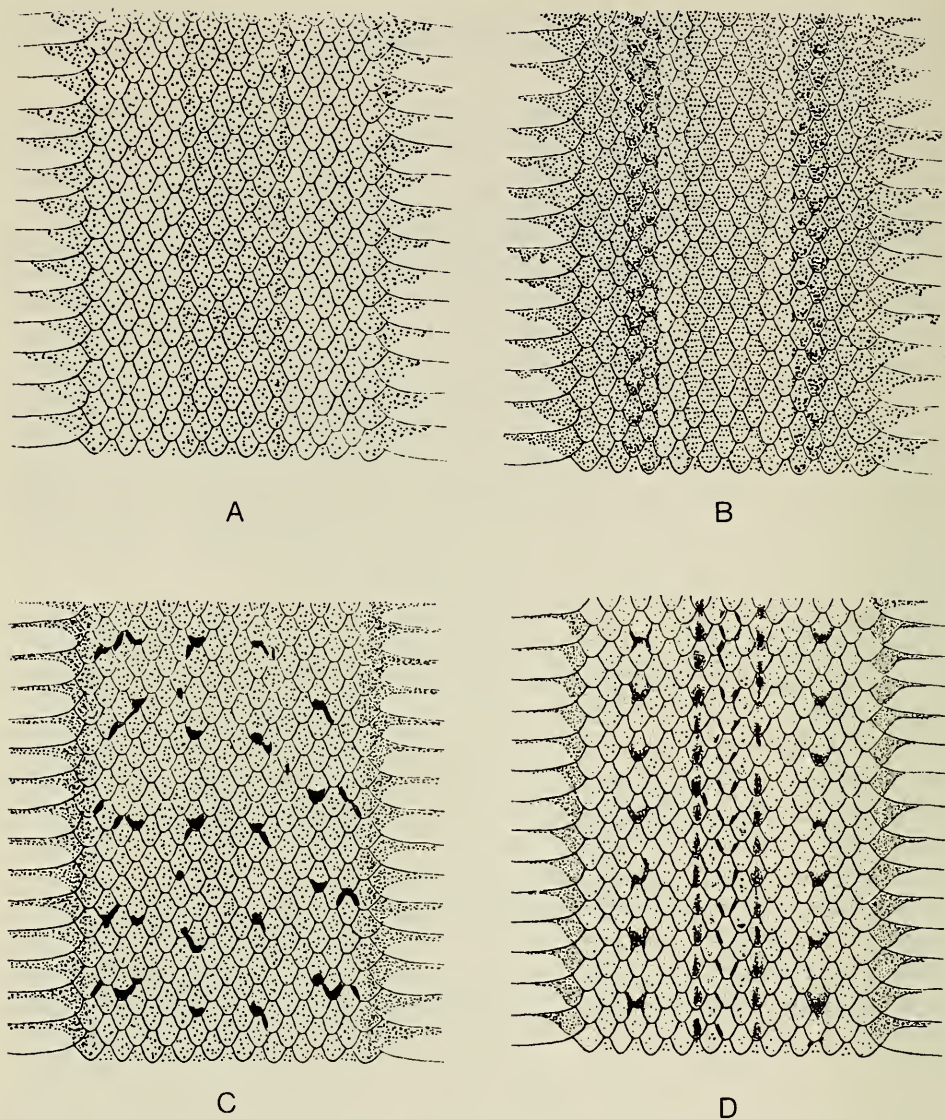


Fig. 2. Dorsal color patterns of four individuals of *Liophis maryellenae*. A, MZUSP 8059; B, TCWC 57701; C, MZUSP 7989; D, AMNH 62202.

their scale row reductions. Three individuals have a simple reduction pattern (Dowling 1951, method), i.e.,

$$18(10) \frac{\quad}{3+4 (44)} 17(156); \quad 19(10) \frac{4+5 (49)}{4+5 (53)} 17(149); \quad 18(10) \frac{\quad}{3+4 (49)} 17(150).$$

The remaining four specimens have very complicated reduction patterns of division and fusion of scale rows three and four and/or four and five on the same, opposite and/or alternating sides of the body. The explanation of the reduction

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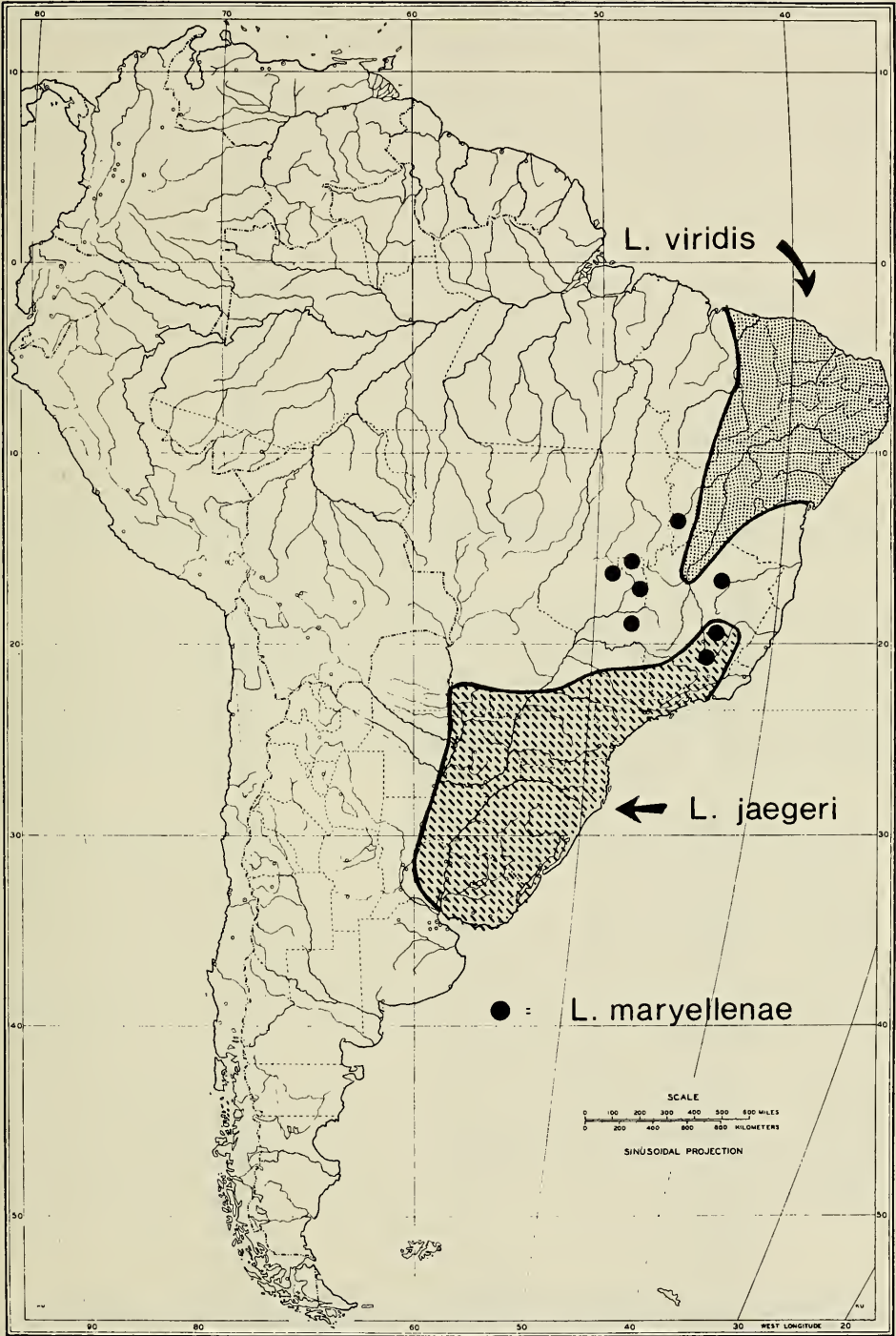


Fig. 3. Distribution of *Liophis maryellenae* in Brazil. Black dots are known localities for *L. maryellenae*; shaded dot area represents the known distribution of *L. viridis*; diagonal dashed area represents the known distribution of *L. jaegeri*.

Table 1.—Scutellation characters of two populations of *Liophis viridis*, one of *L. jaegeri* and one of *L. maryellenae*. The total range of variation is given first, followed by the mean, standard deviation, and sample size in parenthesis.

	Ventrals		Reduction site		Subcaudals		Maxillary teeth	
	Range	Mean (S.D.) (n)	Range	Mean (S.D.) (n)	Range	Mean (S.D.) (n)	Range	Mean (S.D.) (n)
<i>L. viridis</i> (interior)	181-202	189.8 4.30 (98)	102-124	114.6 5.40 (40)	68-84	75.1 3.10 (84)	17-24	20.4 1.1 (92)
<i>L. viridis</i> (coastal)	169-188	179.6 4.36 (57)	98-116	106.6 4.80 (57)	63-83	72.8 4.30 (54)	17-22	19.8 1.4 (42)
<i>L. maryellenae</i>	144-159	150.9 4.30 (10)	74-95	82.9 5.50 (10)	62-82	68.0 5.90 (10)	25-28	26.1 0.9 (10)
<i>L. jaegeri</i>	146-169	157.5 4.50 (151)	normally absent*		52-75	61.2 4.20 (124)	22-29	25.6 1.5 (128)
Simplified scale row reductions								
<i>L. viridis</i> (interior)	19-19-17		(98 specimens)					
<i>L. viridis</i> (coastal)	19-19-17		(57 specimens)					
<i>L. maryellenae</i>	19-19-17		(10 specimens)					
<i>L. jaegeri</i>	17-17-17		(136 specimens)		19-17-17 (1), 17-17-16 (5), 17-17-15 (8)			

* When posterior reductions occur in *L. jaegeri*, they fall between ventrals 88-141, with a mean of 121.2.

mode for one specimen would fill one-half of a printed page (see Thomas and Dixon 1976). The standard counts of body scale rows for these four specimens (10 ventrals posterior to gular scales, midbody, and 10 ventrals anterior to vent) are 18-19-17 (two spec.), 19-17-17, and 19-17-15. One specimen with abnormal body scale rows is from the city of São Paulo. It is an aberrant *L. jaegeri* with a standard body scale row count of 17-17-17. However, an examination of the scale rows by the Dowling method would suggest that the scale rows are (summarized) 17-18-19-18-17-17-19-17-17 (159).

Of the seven specimens from the southeastern edge of the distribution of *L. maryellenae*, two with 19 scale rows at midbody have ventral counts of 148 and 149, well within the median range of *L. maryellenae*. The remaining five specimens with 17 scale rows at midbody have ventral counts of 149, 150, 150, 156, and 157. Three of these have median ventral counts for *L. maryellenae*, and two have the median ventral counts for *L. jaegeri*. In addition, one individual has 36 maxillary teeth (one side), considerably higher than the known range for either *L. jaegeri* or *L. maryellenae* (see Table 1), suggesting considerable abnormality of the sample.

Liophis viridis has a reduction pattern similar to *L. maryellenae*, but has significantly lower numbers of maxillary teeth, higher numbers of ventrals, and higher numbers of ventrals at the first dorsal scale row reduction site ($P = 0.001$) (Table 1).

The data suggest that *L. maryellenae* and *L. jaegeri* are closely related but there are significant differences between them in the scale row reduction mode, numbers of ventrals, subcaudals ($P = 0.001$) and the numbers of maxillary teeth ($P = 0.005$). However, the seven specimens mentioned above suggest a zone of hybridization. The hybrid zone may be extremely narrow because typical specimens of each species have been taken 17 airline km apart without evidence of hybridization.

A description discrepancy occurred in Günther's (1858) description of *Coronella jaegeri*. Günther maintained that *L. jaegeri* had "seventeen or nineteen rows." Neither of Günther's cotypes have 19 scale rows, but he may have examined one with 19 rows but failed to include it with the specimens examined. Boulenger (1894) and Peters and Orejas-Miranda (1970) perpetuated Günther's statement of *L. jaegeri* having 17 or 19 scale rows. Jensen (1900) stated that his new taxon, *Rhadinaea lineata* (ZMUC 601253), from Taboleiro Grande, Minas Gerais, had 19 scale rows. An examination of its essential features indicates that the scale rows are 17 and other scutellation features are similar to *L. jaegeri*. Hence, we have two descriptions that suggest that one or more individuals of *L. maryellenae* may have been examined by Günther and Jensen and left out of their type series, or both men made errors in their original counts. A recent report concerning the salient features of *L. jaegeri* suggests that it has only 17 scale rows (Miranda et al. 1982). I have examined 151 individuals of *L. jaegeri* and all have 17-17-17 or 17-17-15 scale rows (not including aberrancies mentioned in text).

Etymology.—Because of my wife's dedication to my interest in obtaining knowledge of neotropical herpetology, and especially her indulgence in aiding me to accumulate data on over 5000 specimens of *Liophis*, I take pleasure in naming the species for her.

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Literature Cited

- Boulenger, G. A. 1894. Catalogue of the snakes in the British Museum (Natural History). Vol. 2, 382 pp. London: The Trustees of the British Museum.
- Dowling, H. G. 1951. A proposed method for expressing scale reductions in snakes.—*Copeia* 1951: 131–134.
- Günther, A. 1858. Catalogue of colubrine snakes in the collection of the British Museum.—Trustees of the British Museum, London, vi–281 pp.
- Jensen, A. S. 1900. Lagoa Santa Egnens Slang, Et Bidrag til det indre Brasiliens herpetologi.—*Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening, Copenhagen* 1900:99–111.
- Miranda, M. E., G. A. Couturier, and J. D. Williams. 1982. Guía de los ofidios Bonaerenses.—*Asociacion Cooperadora Jardin Zoologico de La Plata, Grafico Kingraf S.R.L., La Plata, Argentina*, 71 pp.
- Peters, J. A., and B. Orejas-Miranda. 1970. Catalogue of the neotropical squamata. Part I. Snakes.—*Bulletin of the United States National Museum* 297:1–347.
- Thomas, R. A., and J. R. Dixon. 1976. Scale row formulae in *Elaphe guttata* (Linnaeus) and notes on their interpretation.—*Natural History Miscellanea* 195:1–5.

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